

WHAT IS CLAIMED IS:

1           1.       A method for controlling access to a communication channel in a communication  
2 system, comprising the steps of:

3           calculating an efficiency value for each communication device of a plurality of  
4 communication devices;

5           calculating a fairness value for each said communication device of said plurality of  
6 communication devices; and

7           providing each of said plurality of communication devices with access to said  
8 communication channel based on a result of the calculating steps.

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1           4.     The method of Claim 3, wherein said step of calculating an efficiency value for each  
2 slave communication device comprises calculating an efficiency value based, at least in part, on  
3 at least one of the presence of data to send from said master communication device to a slave  
4 communication device, and either a traffic demand message sent from a slave communication  
5 device to the master communication device or an estimate of the probability that a slave  
6 communication device has data to send to the master communication device.

5           5.     The method of Claim 3, wherein said step of calculating a fairness value for each  
slave communication device comprises calculating a fairness value based on a predetermined  
definition of fairness.

1           6.     The method of Claim 5, wherein said predetermined definition of fairness includes  
2 agreed to Quality of Service requirements.

1           7.     The method of Claim 1, wherein said communication system comprises a Bluetooth  
2 communication system.

1           8.     A method for controlling access to a communication channel, comprising the steps  
2 of:

3 calculating an efficiency value for each communication device of a plurality of  
4 communication devices;

5 calculating a fairness value for each said communication device of said plurality of  
6 communication devices; and

7 selecting a first communication device from said plurality of communication devices to be  
8 provided access to said communication channel based on a result of said calculating steps.

9. The method of Claim 8, wherein said calculating steps and said selecting step are  
performed by a slave selector in a master communication device, and wherein said plurality of  
communication devices comprise a plurality of slave communication devices.

10. The method of Claim 9, wherein said selecting step comprises selecting the first  
slave communication device to poll based on a result of said calculating steps.

11. The method of Claim 10, wherein said step of calculating an efficiency value for  
each slave communication device comprises calculating an efficiency value based, at least in part,  
on at least one of the presence of data to send from said master communication device to a slave  
communication device, and either a traffic demand message sent from a slave communication  
device to the master communication device or an estimate of the probability that a slave  
communication device has data to send to the master communication device.

1           12.     The method of Claim 8, wherein said step of calculating a fairness value for each  
2 slave communication device comprises calculating a fairness value based on a predetermined  
3 definition of fairness.

1           13.     The method of Claim 11, wherein said predetermined definition of fairness includes  
2 agreed to Quality of Service requirements.

14.     The method of Claim 9, wherein said master communication device and said  
plurality of slave communication devices comprise a piconet in a Bluetooth communication system.

15.     A system for controlling access to a communication channel, comprising:  
a primary communication device; and  
a plurality of secondary communication devices, said primary communication device  
operable to:

calculate an efficiency value for each of said secondary communication devices;  
calculate a fairness value for each of said secondary communication devices; and  
select a first communication device from said plurality of secondary communication  
devices to be provided access to said communication channel based on a result of said  
calculated efficiency value and said calculated fairness value.

1           16.     The system of Claim 15, wherein said primary communication device comprises a  
2     master communication device, said plurality of secondary communication devices comprises a  
3     plurality of slave communication devices, and wherein said first communication device is selected  
4     by polling said first communication device.

1           17.     The system of Claim 16, wherein said master communication device includes a  
2     slave selector for selecting said first slave communication device.

1           18.     The system of Claim 16, wherein said slave selector includes:  
2             a fair share determinator for determining a fair share of bandwidth for at least one of said  
3     plurality of slave communication devices;  
4             a decision maker for determining said next slave communication device to be polled out  
5     of said plurality of slave communication devices; and  
6             at least one slave status tracker for transmitting, to said decision maker, a fraction of said  
7     fair share of bandwidth and a probability of data being available to transmit for said at least one of  
8     said plurality of slave communication devices.

1           19.     The system of Claim 18, wherein said at least one slave status tracker further  
2     comprises:

3 a fraction of fair share estimator for estimating said fraction of said fair share of bandwidth;  
4 a data availability predictor for predicting said probability of data being available to  
5 transmit for said at least one of said plurality of slave communication devices; and  
6 a traffic demand estimator for estimating a traffic demand for at least one of said at least  
7 one slave status tracker.

1 20. The system of Claim 16, wherein said system comprises a Bluetooth communication  
2 system.

1 21. A master device for controlling at least one slave device in a communication system,  
2 said master device comprising:

3 a slave selector for predicting a next slave device from a plurality of slave devices to be  
4 polled, said slave selector comprising:

5 a fair share determinator for determining a fair share of bandwidth for at least one  
6 of said plurality of slaves devices;

7 a decision maker for determining said next slave device to be polled out of said  
8 plurality of slave devices; and

9 at least one slave status tracker for transmitting, to said decision maker, a fraction  
10 of said fair share of bandwidth and a probability of data being available to transmit for said at least  
11 one of said plurality of slave devices.

1           22.    The master device of claim 21, wherein said at least one slave status tracker further  
2 comprises:  
3           a fraction of fair share estimator for estimating said fraction of said fair share of bandwidth;  
4           a data availability predictor for predicting said probability of data being available to  
5 transmit for said at least one of said plurality of slave devices; and  
6           a traffic demand estimator for estimating a traffic demand for at least one of said at least  
7 one slave status tracker.

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